

READ ABOUT

- What iWAN is — and what it isn't
- The critical components of intelligent WAN technology
- How to recognize the right time to deploy iWAN
- Networking trends that increase demand for iWAN

# NETWORK OPTIMIZATION: GETTING STARTED WITH INTELLIGENT WAN

iWAN solutions can reduce costs and maximize the efficient use of existing WAN resources.

Just about any network administrator would jump at a chance to reduce the cost of operating a wide area network while maintaining or improving application performance. These capabilities exist in the form of Intelligent WAN.

Intelligent WAN (or iWAN) moves a step beyond WAN optimization, itself a collection of techniques that have been used for years to increase data-transfer efficiency across WANs. Cisco Systems has been the driving force behind intelligent WAN technology (stylized for the company's products with the all-caps IWAN, but also referred to more generally within IT circles as iWAN). While the networking giant remains a leader in this area, other vendors are offering some or all of the features of intelligent WAN in their own products, allowing enterprise IT shops to pick and choose as they design their own iWAN models. Some of these products are marketed under the intelligent WAN moniker, while others are named according their particular functions, or by alternative names such as "thinking WAN."

The particular names of products are less important to network administrators than the ways in which these tools can help IT shops get the most out of their networks. Namely, iWAN solutions have the potential to decrease costs by moving traffic to less expensive transport options without having a negative effect on security, reliability or performance. These solutions also help to maximize the efficient use of existing WAN resources and help avoid the oversubscription of lines. An iWAN deployment will also enable full visibility and control of applications. Finally, iWAN solutions are being used to shore up network security.

## WHAT IS iWAN?

To understand what iWAN is, it is helpful to first understand what it is not — in particular, what differentiates intelligent WAN from the somewhat similarly named (and more familiar) set of tools known as WAN optimization.

WAN optimization refers to solutions that allow network administrators to manage and accelerate the flow of data across a wide area network, using techniques including deduplication, data compression, caching and virtual private network (VPN) tunneling. These techniques allow IT shops to prioritize traffic and guarantee a certain amount of bandwidth for mission-critical applications. In 2015, Gartner reported that WAN optimization is a \$1.1 billion market that is expected to grow steadily through 2018.

**\$3.2 Billion**

The worldwide intelligent WAN market forecast for 2018 — double the \$1.6 billion global market in 2014

Source: Doyle Research: "Intelligent WAN Market Analysis," 2014

Intelligent WAN solutions incorporate these WAN optimization techniques. But iWAN solutions go even further, offering IT managers more ways to maximize the performance of their wide area networks. In other words, WAN optimization is a part of iWAN, but not all iWAN solutions are considered WAN optimization. One product that illustrates this overlap is Cisco Wide Area Application Services (WAAS) Express, a software-based solution that reduces bandwidth consumption via transport flow optimization (TFO), data redundancy elimination (DRE), compression and enhanced bandwidth optimization. While Cisco WAAS Express is a WAN optimization tool, it is also an iWAN tool. However, Cisco (and other vendors) offer other iWAN solutions that do not fall into the WAN optimization category.

The Chicago firm Doyle Research calls iWAN a "technical convergence" and defines the technology using the following characteristics:

- Support of Internet access options (with multiple carriers) at the branch
- Automated provisioning of new sites and new connections
- The ability to turn capacity up and down as necessary
- The ability to dynamically prioritize traffic types
- Improved security, including flexible VPN access
- Centralized operations, control and policy for all branch office connections
- The ability to rapidly resolve traffic issues through real-time monitoring

## THE 4 COMPONENTS OF iWAN

### 1. TRANSPORT INDEPENDENCE

The idea behind transport independence is that traffic can and should (when possible and appropriate) be moved to less expensive Internet pipelines — and away from much more expensive multiprotocol label switching (MPLS) connections — in a way that will not compromise security, reliability or performance. Transport independence gives IT administrators the option to distribute branch office traffic over multiple transport options, including MPLS, cellular and Internet WANs, while maintaining one routing domain. Hallmarks of this approach include provider flexibility, scalable and modular design, and a consistent operational model.

Transport independence relies on technologies including Dynamic Multipoint Virtual Private Network (DMVPN) and Internet Protocol Security (IPSec). Cisco DMVPN is a software solution that utilizes a centralized architecture to provide easier implementation and management of deployments with diverse user communities. The technology allows branch locations to communicate directly over a public WAN or the Internet when using applications such as Voice over IP, without requiring a permanent VPN between the sites. The use of IPSec encryption technology provides a high level of security through encryption and authentication.

### 2. INTELLIGENT PATH CONTROL

Performance Routing (PfR), the technology behind intelligent path control, is such a powerful tool that some observers consider it the central component of (or even synonymous with) iWAN. The technology monitors application performance on a per-flow basis and selects the best-performing pathway for each application, based on policy and real-time path status. This leads to load balancing of applications such as cloud traffic, guest services and video across multiple lines, and allows for full utilization of bandwidth and improved network availability.

While traditional routing can provide load sharing and failure mitigation, performance routing makes real-time adjustments based on performance, rather than solely on static routing metrics, leading to highly available paths across the Internet and WAN. Cisco's performance routing technology has three components: a master controller, one or more border routers, and two or more network egress interfaces. In this design model, the Cisco PfR Master Controller assumes the role of the intelligent decision-maker and dynamically retrieves all required information from the border routers (which are themselves the egress elements toward the Internet or external WAN network).

Benefits of performance routing include improved application availability, improved application performance, full utilization of all WAN bandwidth, reduced WAN operating expenses and increased uptime. The solution minimizes negative effects of network degradation — monitoring the network for high latency or packet loss and then automatically rerouting traffic around the affected path. Additionally, performance routing allows organizations to minimize traffic sent over expensive links or to consolidate multiple connections, resulting in cost savings. This automatic performance optimization can also reduce engineering operating expenses associated with manual analysis and tweaking of network performance.

The global business analytics software and services company SAS has utilized Cisco Performance Routing at its headquarters to control communication costs, improve employee productivity and efficiency, and ensure uninterrupted performance of communication services. The company achieved a two-month return on its investment in the technology, driven by a reduction in Internet coverage fees. An IT manager at the organization said of the solution, "The real benefit that [performance routing] delivers is that it lets us simplify our network configuration and improve the performance, without having to do a lot of manual fine-tuning."

### 3. APPLICATION OPTIMIZATION

This component of intelligent WAN includes WAN optimization solutions such as Cisco WAAS and Akamai Connect, as well as application visibility and control (AVC) solutions. Cisco WAAS utilizes a variety of techniques to reduce bandwidth consumption. Akamai Connect, meanwhile, integrates routing, security, caching and WAN optimization technologies into a single solution.

AVC tools provide application-level classification, monitoring and traffic control to help reduce network operating costs, improve the performance of critical applications and support capacity management and planning. One AVC tool, LiveAction, visualizes traffic paths and performance before and after any path changes that are made by performance routing tools, which helps provide meaningful and actionable information to enable users to achieve a better return on investment. The solution features a dashboard that allows network administrators to monitor application performance and also creates detailed reports for analysis and troubleshooting.

### 4. HIGHLY SECURE CONNECTIVITY

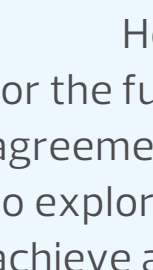
Hallmarks of this iWAN component include certified strong encryption, comprehensive threat defense and scalable direct Internet access — features that are powered by technologies such as Cisco's IOS Firewall, Next-Generation Intrusion Prevention System (NGIPS) and Cloud Web Security (CWS). Highly secure connectivity is a crucial component of iWAN for obvious reasons. No amount of network optimization is going to benefit an enterprise if sensitive data is compromised in the process.

Cisco's IOS Firewall protects network resources by using existing routing capabilities to offer distributed threat mitigation of viruses, worms and other network and application-layer threats. The solution also helps enterprises achieve compliance with regulations such as the Payment Card Industry Data Security Standard (PCI DSS), the Health Insurance Portability and Accountability Act (HIPAA) and the Sarbanes-Oxley Act (SOX). It also ensures that critical collaboration resources stay available and resistant to potential exploits.

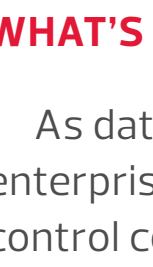
Cloud Web Security, which delivers security through a Software as a Service cloud model, provides advanced malware protection and simplifies the security environment for IT staff. The operating expenses model can reduce costs by 30 to 40 percent compared with on-premises products, Cisco estimates.

## iWAN IN ACTION

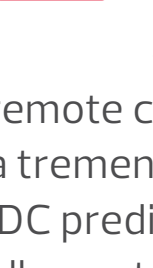
Several organizations are already using intelligent WAN to cut costs, improve performance and enhance security. Here are a few examples to consider.



**Customer service:** An international airline utilized intelligent WAN to expand customer service. With Performance Routing, noncritical applications can be offloaded in order to allow bookkeeping and reservations to continue running, resulting in reduced downtime and a 30 percent increase in consumable bandwidth. Before implementing intelligent WAN, the company had to spend money on backup lines to assure connectivity, but those lines went unused most of the time. "We needed an intelligent network," says a senior systems and design engineer at the airline. "With the Cisco intelligent WAN solution, we can optimize scale and performance using our Cisco routers."

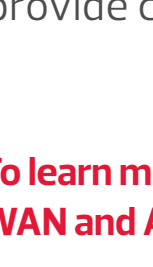


**Uptime improvement:** A shipping company with 500 employees deployed intelligent WAN to replace a routing system that allowed onboard crews to support only one of its four service carriers at a time. Before adopting intelligent WAN, crew members had to scramble to find a communications link during outages that lasted up to five minutes, and the existing router software also lacked security features to comply with tightening government regulations. The intelligent WAN solution gave the company continuous connectivity and allowed it to exceed government compliance standards. The solution even lowered connectivity costs — achieving a 30 to 40 percent savings in communication expenses — because the new system can determine and switch to the least expensive available service provider.



**Security:** An industrial auction company with more than 40 sites worldwide used intelligent WAN and complementary Cisco solutions to improve performance and enhance security. With the intelligent WAN solution, web requests from each auction site are sent directly to Cisco Cloud Web Security. Because the requests no longer travel over the multiprotocol label switching (MPLS) WAN, they don't slow down the company's business applications. The solution also provides firewall services within the same device that allows the company to connect to Cloud Web Security, the Internet and the MPLS network. "This saves space, power, cooling and management costs," says a senior network security specialist for the auction company.

**Software-driven WAN functionality:** The rise of software-defined networking and network function virtualization will remove the need for IT organizations to deploy dedicated devices to achieve desired performance and functionality, which will lead to the growth of WAN as a Service offerings, the firm predicts.



**Management and monitoring:** Doyle Research calls WAN management "one of the leading pain points" for IT organizations and says that fixing performance and security issues is costly and time consuming because of the complexity of networks. Because of this cost and complexity, the firm suggests that successful iWAN solutions will need to be easy to install and operate, will need to integrate well with routers and network security, and will need to provide centralized management capabilities.

To learn more about improving network productivity, flexibility and security, check out CDW's WAN and Application Optimization page.

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